

IN THE CLAIMS

Please amend and/or cancel the claim(s) of the captioned application, and/or add claim(s) to the captioned application, in accordance with the following annotations and/or mark-ups showing all change(s) relative to the previous version(s) of the claim(s) as required by 37 C.F.R. 1.121:

1. (Currently amended) A method for producing an index indicative of brain disease comprising the steps of:

collecting positron emission tomographic image data showing metabolic activity in the ~~brain~~ brains of ~~a patient~~ control subjects while at rest;

spatially normalizing said image data using a standardized three dimensional coordinate system;

spatially filtering the normalized image data;

collecting positron emission tomographic image data showing metabolic activity in the brain of a patient to be tested for cognitive decline while at rest;

selecting specific regions of the brain of the patient showing extremes in metabolic activity;

collecting mean intensity values for the normalized, smoothed image data from said selected specific brain regions;

~~weighting said mean intensity values with standard weights derived from the group analysis used to create the standard; and~~

normalizing the ratio of said mean, ~~weighted~~, metabolic activity image data to produce a numerical index for the patient for comparison to the numerical index derived from the control subjects.

2. (Original) The method according to claim 1 wherein the metabolic activity is indicated by glucose metabolism of brain cells.

3. (Currently amended) The method according to claim 1 wherein the image data is spatially transformed into a standardized three-dimensional coordinate system ~~is Talairach space~~.

4. (Original) The method according to claim 3 wherein the image data is transformed to conform in Talairach space using a twelve parameter, linear, affine algorithm.

5. (Currently amended) The method according to claim 1 wherein the ~~transformed~~ image data is smoothed using an eight millimeter, isotropic, Gaussian filter kernel.

6. (Currently amended) The method according to claim 1 wherein said normalized, smoothed image data is compared to the data from age-matched-patient controls the control subjects using Standard Parametric Mapping techniques in a statistical group comparison.

7. (Original) The method according to claim 6 wherein the Standard Parametric Mapping is used to generate a map of the brain and the map is converted to a unit normal distribution Z score.

8. (Currently amended) The method according to claim 7 6 wherein the Standard Parametric Mapping ~~Z-score~~ results are utilized to select the specific regions of the brain showing extremes in metabolic activity.

9. (Original) The method according to claim 1 wherein statistical mapping procedures are utilized to create a plurality of three dimensional, identically sized, spherical volumes of interest.

10. (Currently amended) The method according to claim 9 wherein mean intensity values for ~~the~~ volume elements ~~are~~ contained within each of said volumes of interest are determined wherein each said volume element is a cube of selected dimension.

11. (Currently amended) The method according to claim 9 wherein each of a plurality of volumes of interest is placed at specific coordinates in ~~said a~~ a three dimensional coordinate system.

12. (Original) The method according to claim 9 wherein two sets of volumes of interest are selected, the first set being comprised of a plurality of volumes of interest with increased metabolism and the second set being comprised of a plurality of volumes of interest with decreased metabolism.

13. (Original) The method according to claim 12 wherein said first set of volumes of interest comprises four volumes of interest with increased metabolism and said second set of volumes of interest comprises ~~nine~~ volumes of interest with decreased metabolism.

14. (Original) The method according to claim 12 wherein the intensity values of said volumes of interest are used to create a first and second data set, said first data set comprising the ratios of the mean value of the intensities of the first set of volumes of interest with increased metabolism divided by the intensity values of each of the volumes of the second set of volumes of interest with decreased metabolism and said second data set comprising the ratios of each of the intensity values of the first set of

volumes of interest with increased metabolism divided by the mean value of the intensities of the second set of volumes of interest with decreased metabolism.

15. (Original) The method according to claim 14 wherein the intensity values of the set of said thirteen volumes of interest are used to create a third and fourth data set, said third data set comprising the ratios of the mean of the intensity value of the set of four volumes of interest with increased metabolism divided by the intensity values of each of the nine volumes of interest with decreased metabolic activity and the fourth data set comprising the ratio of each of the intensity values of the set of four volumes of interest of increased metabolic activity divided by the mean value of the intensities of the volumes of interest with increased metabolic activity.

16. (Currently amended) A method for diagnosing degenerative brain disease comprising the steps of:

- collecting positron emission tomographic image data showing metabolic activity of ~~a~~ the brain of a patient while at rest;

- spatially normalizing said image data using a three dimensional coordinate system;

- smoothing said normalized image data;

- applying objective statistical analysis to ~~select~~ specific regions of the brain, ~~said regions~~ showing extreme changes in metabolic activity;

- collecting mean intensity values for said normalized, smoothed ~~image~~ data from said ~~selected~~ specific brain regions;

- weighting said mean intensity values based on a comparison of said mean intensity values taken from said patient to a set of mean intensity values of said specific brain ~~region~~ regions taken from a normal patient population; and

- calculating an index using said weighted, mean intensity values wherein said index is a normalized ratio of said weighted, mean intensity values, taken from said ~~sampled~~ specific brain regions.

17. The method according to claim 1 wherein the disease detected is one or more of the following diseases:

- Alzheimer's disease;

- Parkinson's disease;

- Huntington's disease;

- Pick's Dementia;

- dementia with Lewy bodies;

disease resulting from head injury;
disease resulting from patient intake of drugs; and
disease resulting from patient intake of alcohol.

18. (Currently amended) The method according to claim 1 19 additionally comprising the steps of:

using said weighted intensity values as a baseline reference for iterative optimization of each weighted intensity value;

forming a subset of weights taken from a control subject database said control subjects forming a first group;

maximally separating each of said weighted intensity values of each region taken from said patient from intensity values of analogous regions taken from control subjects using a dynamic table of patient weights and control subject weights wherein separations in intensity values between the patients and the normal controls are assessable in real time;

merging patient data with data from previous patients in a patient database to constitute a second group;

iteratively adjusting said weighted intensity values to maximize the separation between said patient and said control subjects while minimizing within-group variance; and

calculating a second Cognitive Decline Index utilizing the optimized weighted intensity values.

19. (New) The method of claim 1 additionally comprising the step of weighting said mean intensity values with standard weights based on the frequency of brain abnormalities across the control subjects and the patient.

20. (New) The method of claim 16 wherein statistical mapping procedures are utilized to create a plurality of three dimensional volumes of interest in the specific regions of the brain mapped to specific coordinates in the three dimensional coordinate system to optimize comparability between the patient and the normal patient population.